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PCT#3

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: ALEXANDER DYCK *ET AL.*)
)
SERIAL NO. 09/914,704) ART UNIT: TO BE ASSIGNED
)
FILED:) EXAMINER: TO BE ASSIGNED
)
FOR: SULFONATED AROMATIC POLYMERS,)
MEMBRANE CONTAINING SAID)
POLYMERS AND A METHOD FOR THE)
PRODUCTION AND USE OF THE SAME)

Asst. Commissioner for Patents
Washington, D.C. 20231

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST-CLASS MAIL IN AN ENVELOPE ADDRESSED TO: ASST. COMMISSIONER FOR PATENTS AND TRADEMARKS, WASHINGTON D.C. 20231 ON THIS 23rd DAY OF October 2001. BY: Cause A. McPherson

SUBMISSION OF PRELIMINARY EXAMINATION REPORT

Sir:

Enclosed with this paper is a copy of the International Preliminary Examination Report (PCT/EP00/01785).

No additional fee is due. If there are any additional fees due in connection with the filing of this response, including any fees required for an additional extension of time under 37 CFR 1.136, such an extension is requested and the Commissioner is authorized to charge or credit any overpayment to Deposit Account No. 03-2775.

Respectfully submitted,

CONNOLLY, BOVE, LODGE & HUTZ, LLP

By Ashley I. Pezzner
Ashley I. Pezzner

Reg. No. 35,646
Tel. (302) 888-6270

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Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 1999/F044 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/01785	International filing date (<i>day/month/year</i>) 01 March 2000 (01.03.00)	Priority date (<i>day/month/year</i>) 02 March 1999 (02.03.99)
International Patent Classification (IPC) or national classification and IPC B01D 71/52		
Applicant CELANESE VENTURES GMBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 01 September 2000 (01.09.00)	Date of completion of this report 29 June 2001 (29.06.2001)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP00/01785

I. Basis of the report

1. This report has been drawn on the basis of (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

☒ the international application as originally filed.

☒ the description, pages 1-18, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____.

☒ the claims, Nos. 1-18, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____.

☐ the drawings, sheets/fig _____, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

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national application No.
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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2, 5-7, 14, 16, and 18	YES
	Claims	1, 3, 4, 8-13, 15, and 17	NO
Inventive step (IS)	Claims	18	YES
	Claims	1-17	NO
Industrial applicability (IA)	Claims	1-18	YES
	Claims		NO

2. Citations and explanations

- 1.) The disclosure of each of the documents
US-A-4 971 695 (D1), US-A-5 364 454 (D2), and
US-A-5 071 448 (D3) is prejudicial to the novelty of
the aromatic polymer corresponding to Claim 1.

Each of these documents discloses a sulfonated aromatic polymer containing the recurring structural unit of Formula (I) as defined in Claim 1 of the application (cf. (D1), Examples 1, 2, and 4-7, in which Ar^2 in the examples stands for phenylene-SO₂-phenylene and $m = \text{zero}$; (D2), Example 6 in column 11, lines 18-40, in which Ar^2 stands for phenylene-SO₂-phenylene and $m = \text{zero}$; and (D3), Example 3, in which Ar^2 stands for CH₃-phenylene-SO₂-phenylene-CH₃ and $m = \text{zero}$).

Reference is made to the interpretation of the meaning of Ar^2 on page 3, lines 28-30 of the application.

As a result, Claim 1 would not appear to satisfy the requirements of PCT Article 33(2) and (3).

- 2.) The structural unit of Formula (II) corresponding to

dependent Claim 2 is conventional in the field of membrane production (cf. (D1), column 8, lines 10-68, Example 3; (D2), column 3, line 62 to column 4, line 9; (D3), Example 6).

Claim 2 would not appear to add an inventive feature to Claim 1 without an unexpected effect in the combination of the structural unit of Formula (I) according to Claim 1 with the structural unit of Formula (II) according to dependent Claim 2.

- 3.) Dependent Claim 3 does not add any new feature to Claim 1 because what has been said of Claim 1 applies here to the meaning of $m = \text{zero}$ (e.g., the grouping $X\text{-Ar}^2$ is optional).
- 4.) The feature of dependent Claim 4 is known from each of documents (D1) to (D3) (cf. the corresponding comments on Claim 1 in point 1.)).
- 5.) The structural unit of Formula (III) corresponding to dependent Claim 5 is conventional in the field of membrane production (cf. (D2), column 3, lines 47-61, column 4, lines 21-68, and Claims 5, 13; and (D3), column 3, line 66 to column 4, line 30, column 4, line 56 to column 5, line 24, Claims 1, 2, 8, 10, 16, 18, 24, and 26).

Claim 5 would not appear to add any inventive features to Claim 1 without an unexpected effect in the combination of the structural unit of Formula (I) according to Claim 1 with the structural unit of Formula (III) according to dependent Claim 5.

- 6.) It is not clear that the molar portions of corresponding recurring structural units defined in dependent Claim 6 impart an inventive step to Claim 5 (and thus to Claim 1).
- 7.) The sulfonated aromatic polymers of the recurring structural unit according to dependent Claim 7 are novel in light of the searched prior art. However, it is not clear at present that the preparation of sulfonated aromatic polymers containing the structural unit according to Claim 7 involves an inventive step in view of the searched prior art (cf. document US-A-4 625 000 cited in the application, the fifth compound in Claim 19).
- 8.) The feature of dependent Claim 8 is known from each of documents (D1) to (D3) (cf. (D1), Examples 1, 2, and 4-7; (D2), Example 6; and (D3), Example 3).
- 9.) The sulfonated polymers according to Claim 1 described in each of documents (D1) to (D3) (cf. point 1. above) are similarly further processed into membranes (cf. (D1), Examples 2 and 4-7; (D2), Example 6; and (D3), Example 3 in conjunction with column 7, line 58 to column 8, line 30).
- As a result, the subject matter of Claim 9 would appear not to satisfy the requirements of PCT Article 33(2) and (3).
- 10.) The definition of the parameters of the membrane according to dependent Claim 10 would appear to be satisfied by each of the sulfonated polymer membranes known from (D1) to (D3) (cf. point 9. above).

- 11.) Dependent Claim 11 would not appear to add any novel feature to Claim 9 because document (D1) already discloses that additional aromatic polymer components, such as sulfonated polysulfones or polyvinylpyridine, are suitable for forming the membrane (cf. column 5, lines 13-28).
- 12.) The feature of dependent Claim 12 is known from each of documents (D1) and (D3) (cf. (D1), column 6, lines 45-50; (D3), column 7, lines 60-67).
- 13.) The production process according to Claim 13 would not appear to be novel in view of the disclosure of each of (D1) - (D3).

Each of these documents discloses a process for producing a membrane that falls under Claim 9 of the present application (cf. point 8. above), comprising the steps of dissolving a polymer according to Claim 1 of the present application in an organic, aprotic solvent, daubing the solution onto a substrate, and evaporating the solvent while forming the membrane (cf. (D1), Examples 6 and 7; (D2), Example 6; and (D3), column 6, lines 34-38 and column 7, lines 9-16).

As a result, Claim 13 would not appear to satisfy the requirements of PCT Article 33(2) and (3).

- 14.) The solvents listed in dependent Claim 14 are conventional in the production of polymer coating solutions (cf. (D1), column 5, lines 35-45). The same applies to the concentration range given in Claim 14.

- 15.) The features of dependent Claim 15 are known, for example, from document (D2) (see Example 6).
- 16.) The features of dependent Claim 16 are conventional in the production of (separation) membranes.
- 17.) The membranes known from each of documents (D1) and (D3) are used in separation processes that can certainly be subsumed under the category "ultrafiltration" (cf. (D1), column 6, lines 43-44; (D3), column 7, lines 54-55).

As a result, Claim 17 does not appear to satisfy the requirements of PCT Article 33(2) and (3).

- 18.) The searched prior art neither discloses nor suggests the features of use Claim 18.
- 19.) The industrial applicability of the subject matter of the application is clearly established (PCT Article 33(4)).

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VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The description should briefly acknowledge
documents US-A-5 364 454 and US-A-5 071 448
(PCT Rule 5.1(A)(ii)).

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1.) Aromatic polymers that are not sulfonated (namely, $n = 0$) also fall under Claim 1.
As a result, the designation "sulfonated aromatic polymer" in Claim 1 is inaccurate (PCT Article 6).

2.) The optional feature of Claim 1, namely, "radicals or sulfonic acid groups optionally substituted with one or more monovalent organic groups that are inert under operating conditions", is unclear both in terms of its wording and the exact meaning of "monovalent organic groups". The attempt to define the monovalent organic groups by referring to "operating conditions" that are left completely unspecified results in a lack of clarity because a product cannot be characterized by reference to the conditions of a later (arbitrary) use (a product is characterized by its product features).

Moreover, the above optional feature is not supported by the description (cf. page 3, lines 13-19 of the application).

The objection regarding the "monovalent organic groups that are inert under operating conditions" also applies to dependent Claim 5.

3.) The formulation of Claim 15, namely, "and that the salt forms can be transformed into the acid form through treatment with an acid after production of the membrane", is unclear and should be reworded in light of the original disclosure (PCT Article 6).